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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/816,585

03/31/2004

William H. Whitted

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23689

7590

03/03/2006

EXAMINER

PAPE, ZACHARY

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ART UNIT

PAPER NUMBER

2835

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/816,585

Applicant(s)

WHITTED, WILLIAM H.

Examiner

Zachary M. Pape

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/12/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. **Therefore, the fan of claim 1, the shelves of claim 3, the fan controller of claim 4, the valve and valve controller of claim 5, the facility of claim 12, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.**

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 27 is rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility.

Claim 27 recites that a heat exchange fluid is cooled using a compressor, however the examiner notes that the refrigeration cycle as disclosed by the applicant in the specification cannot operate such that the compressor cools the heat exchange fluid. In the type of cycle disclosed by the applicant, the refrigerant is compressed and condensed (in the condenser) from a gas to a liquid and thus the refrigerant gives off heat when being compressed by the compressor. Later in the cycle the refrigerant is eventually expanded at a nozzle which allows the refrigerant to expand again from a liquid to a gas in the evaporator where the liquid coolant is thus able to absorb heat.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 7-9, 11-12, 23, 28, 29-30, 32, 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Chu et al. (US 2004/0100770).

With respect to claim 1, Chu et al. teaches a system for cooling electronic components, comprising; a structure (10) defining a plurality of spaces (occupied by 13 and 21), each space having an inlet (To the left of 13 as shown in Fig 9) and an outlet (To the right of 13) and being otherwise generally enclosed and containing at least one of the electronic components (13) mounted therein; at least one heat exchanger (21) being one of adjoining the structure at the inlets of the spaces (As illustrated in Fig 8b) and disposed within the plurality of spaces at the inlets of the spaces, the heat exchanger being configured to channel a heat exchange fluid to cool air as air flows therethrough; a fan (11) disposed in each of the plurality of the spaces (As illustrated in Fig 9) configured to pull air through the inlet via the heat exchanger, to direct air past the at least one electronic component mounted in the space to cool the electronic component, and to exhaust the air through the outlet; and a cooling module (Attached to inlet 41 and exit 42) in fluid communication with the at least one heat exchanger (Via 41 and 42 as illustrated in Fig 8a) for cooling the heat exchange fluid, the cooling module being located remote to the spaces (Since the entrance and exit 41 and 42 are external to the structure and spaces, the cooling module must also be remote to the spaces).

With respect to claim 2, Chu et al. further teaches a plurality of the heat exchangers (21), each heat exchanger corresponding to one of the plurality of spaces (As illustrated in Fig 8b).

With respect to claim 7, Chu et al. further teaches that the heat exchange fluid is selected from the group comprising water, phase change refrigerants, chilled air, brine, antifreeze mix, and oil (Paragraph 53).

With respect to claim 8, Chu et al. further teaches that each heat exchanger includes a heat exchange fluid channeling device and a heat exchange apparatus in thermal communication with the heat exchange fluid channeling device (See present office action Fig 1 below).

With respect to claim 9, Chu et al. further teaches that the heat exchange apparatus includes a plurality of heat exchange fins through which the heat exchange fluid channeling device extends (As illustrated in Fig 8a of Chu).

With respect to claim 11, Chu et al. further teaches that the heat exchange fluid channeling device is U-Shaped (As illustrated in Fig 8a) and includes a supply portion (Connected to 41) to supply the heat exchange fluid from the cooling module to the heat exchange apparatus and to return (Via 42) the heat exchange fluid to the cooling module.

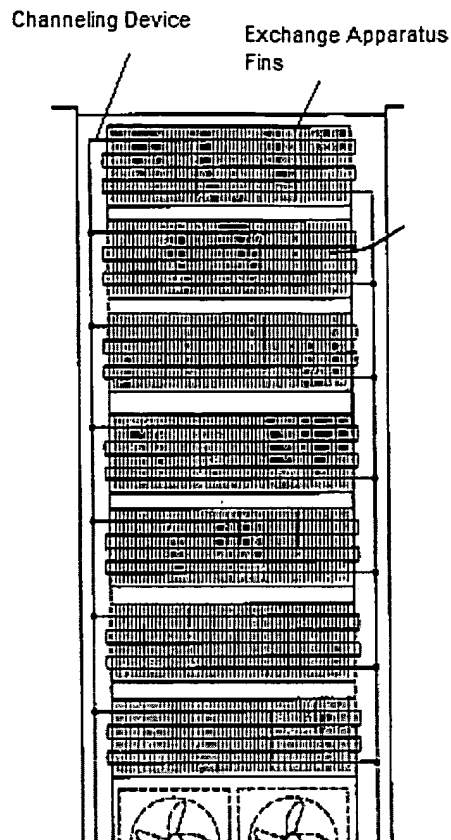


Fig 1

With respect to claim 12, the examiner hereby takes official notice that the structure such as the one taught by Chu et al. resides in a facility. To that end, the plurality of heat exchangers (21) of Chu et al. and the fans (11 as shown in Fig 8b) draw ambient air from the facility.

With respect to claims 23, 28, 29, 30, 32, 33, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu et al. reference.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (Hereafter - Chu 770) in view of Chu et al (Hereafter - Chu 412).

With respect to claim 3, Chu 770 further teaches that the structure (10) is a rack structure and the electronic components (13) are computer components mounted on shelves of the rack structure (As illustrated in Fig 8b), each shelf corresponding to one of the spaces. Chu 770 fails to specifically teach that the system comprises a plurality of the rack structures. Chu 412 teaches the conventionality of making a system out of a plurality of rack structures (20 – as illustrated in Fig 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chu 412 with that of Chu 770 to provide cooling to multiple rack systems.

With respect to claim 24, the method step recited in the claim is inherently necessitated by the device structure as taught by the Chu et al. references.

Claims 4-5, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. in view of Beitelmal et al. (US 2003/0053293).

With respect to claim 4, Chu 770 teaches the limitations of claim 1 above but fails to teach a fan controller corresponding to each fan, the fan controller being configured to variably control a speed of the corresponding fan according to at least one of a temperature within the corresponding space and a temperature of at least one of the at least one electronic component mounted within the corresponding space. Beitelmal et al. teaches the conventionality of utilizing a fan controller (50) being configured to control a speed of the corresponding fan according to temperature data (Paragraph 33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal et al. with that of Chu 770 to provide substantial supply of cooling fluid individually varied in accordance with actual or anticipated temperatures of heat generating components (Beitelmal: Paragraph 9).

With respect to claim 5, Beitelmal et al. teaches the conventionality of using a valve (42)/valve controller (44) combination to control the temperature within a rack (See Beitelmal; paragraphs 31 – 34).

With respect to claims 25-26, the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu et al. and Beitelmal et al. references.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Chu et al. (US 6,250,796 - Hereafter Chu 796).

With respect to claim 6, Chu 770 teaches the limitation of claim 1 above but fails to specifically teach that the cooling module is a direction expansion condensing unit.

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Chu 796 teaches the conventionality of utilizing a cooling module (60) that is a direct expansion condensing unit. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chu 796 with that of Chu 770 to provide a means or mechanism for utilizing multiple heat exchange fluids for optimal transport of thermal energy away from electronic circuit components (Chu 796: Column 2, Lines 59-62).

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Kubota et al. (US 2002/0139554).

With respect to claim 13, Chu 770 teaches, a system for cooling electronic components, comprising: means (10) for defining a plurality of spaces, each space having an inlet and an outlet and being otherwise generally enclosed and containing at least one of the electronic components (13) mounted therein; means (21) for cooling air, the means for cooling air being one of adjoining the inlets of the spaces and disposed within the plurality of spaces at the inlets of the spaces; and means (11) for directing the air from ambient air in the means for containing through the inlet to the outlet of the spaces and past the means for cooling. Chu 770 fails to specifically teach a means for containing a plurality of the means for defining the spaces. Kubota et al. teaches the conventionality of having a second means (1) for containing a plurality of means (4) for defining a plurality of spaces. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kubota et al. with

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that of Chu 770 to provide further housing for the means for defining a plurality of spaces. Providing additional housing provides additional protection to the means.

With respect to claim 14, Chu 770 further teaches a plurality of the means (21) for cooling air, each means for cooling air corresponding to one of the plurality of spaces (As illustrated in Fig 8b).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Kubota et al. and further in view of Chu 412.

With respect to claim 15, Chu 770 further teaches that the means for containing is a rack structure and the electronic components are computer components mounted on shelves of the rack structure (As illustrated in Fig 8b), each shelf corresponding to one of the spaces. Chu 770 in view of Kubota et al. fails to teach that the system comprises a plurality of the rack structures. Chu 412 teaches the conventionality of making a system out of a plurality of rack structures (20 – as illustrated in Fig 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chu 412 with that of Chu 770 to provide cooling to multiple rack systems.

Claims 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Kubota et al. and further in view of Beitelmal et al.

With respect to claim 16, Chu 770 teaches the limitations of claim 13 above but fails to teach that the means for direction including means for variably controlling flow

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rate of the air, wherein the means for variably controlling is according to at least one of a temperature within the corresponding space and a temperature of at least one of the at least one electronic component mounted within the corresponding space. Beitelmal et al. teaches the conventionality of utilizing a fan controller (50) being configured to control a speed of the corresponding fan according to temperature data (Paragraph 33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal et al. with that of Chu 770 to provide substantial supply of cooling fluid individually varied in accordance with actual or anticipated temperatures of heat generating components (Beitelmal: Paragraph 9).

With respect to claim 17, Beitelmal et al. teaches the conventionality of using a valve (42)/valve controller (44) combination to control the temperature within a rack (See Beitelmal; paragraphs 31 – 34).

With respect to claim 18, Chu 770 further teaches that the heat exchange fluid is selected from the group comprising water, phase change refrigerants, chilled air, brine, antifreeze mix, and oil (Paragraph 53).

With respect to claim 19, Chu 770 further teaches that the means for cooling air (21) includes a means (As illustrated in the present office action Fig 1 above) for channeling a heat exchange fluid and means (Fins as illustrated in POA Fig 1 above) for channeling the heat exchange fluid extends.

With respect to claim 20, Chu 770 further teaches that the means for heat exchange includes a plurality of heat exchange fins through which the means for channeling the heat exchange fluid extends (As illustrated in POA Fig 1 above).

With respect to claim 21, Chu 770 further teaches that the means for channeling the heat exchange fluid includes an annular channel through which the heat exchange fluid flows.

With respect to claim 22, Chu 770 further teaches that the means for channeling the heat exchange fluid is U-shaped (As illustrated in Chu Fig 8b).

Claims 10 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Zhu et al. (US 6,481,492).

With respect to claim 10, Chu 770 teaches the limitations of claim 8 above, but fails to teach that the heat exchange fluid channeling device comprises an external member and an inner baffle defining an annular channel therebetween and through which the heat exchange fluid flows. Zhu et al. teaches the conventionality of utilizing an external member (1) and an inner baffle (2) defining an annular channel (3) therebetween and through which the heat exchange fluid flows. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Zhu et al. with that of Chu 770 to provide increased efficiency of heat transfer (Zhu: Column 2, Lines 12-16).

With respect to claim 31, the method step recited in the claim is inherently necessitated by the device structure as taught by the Chu 770 and Zhu references.

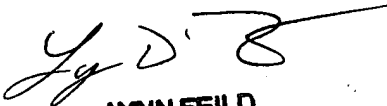
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary M. Pape whose telephone number is 571-272-2201. The examiner can normally be reached on Mon. - Thur. & every other Fri. (8:00am - 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached at 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ZMP


LYNN FEILD
SUPERVISORY PATENT EXAMINER